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NEUROPEPTIDES AND EPILEPSY: HELP OR HINDRANCE?
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Neuropeptides in the hippocampus and cortex have been used most commonly as a means of classifying interneurons, resulting in a bewildering array of cell types whose roles are only slowly emerging. While our understanding of the roles of interneurons in the hippocampus has expanded with the technological advances of recent years, it has been restricted to the GABA functions of these cells, their electrophysiological and synaptic properties, while the transmitter functions in cortical and hippocampal physiology of their neuropeptides remain largely unclear. Peptidergic neurons are affected by epilepsy, some being par-ticularly vulnerable to excitotoxic damage, and the expression of some neuropeptides and their receptors is differentially regulated in existing

or surviving neurons in epilepsy. Finally, the roles that different recep-tors, even for any one neuropeptide, play in the prevention, induction and/or maintenance of seizure expression are controversial. Based on current evidence, it is reasonable to hypothesize that neuropeptides in the hippocampus and cortex can help regulate excitability, fine-tune neuronal responses, and extend the dynamic range of conventional transmitter systems by altering the input or output of such systems to match unusual conditions. Such effects can be either inhibitory, excit-atory, or both, and can therefore potentially help or hinder the devel-opment and expression of seizures under pathophysiological condi-tions. Most present anticonvulsant drugs interfere with nerve impulse propagation or GABA and glutamate receptors of seizure-prone neu-rons, but many of their adverse effects arise from these same actions on neurons of healthy brain regions. With the large array of neuropeptides and other neuromodulators present in the brain, it is conceivable that one or a combination of several peptide transmitters may provide unique, local regulation of a particular brain region, such as the hip-pocampus, potentially providing control of seizure activity in a site-specific manner. We will present evidence for the selective modulatory roles of several neuropeptides in nomal and pathological physiology. Dr. Claude Wasterlain (UCLA) will present work on Substance P and Galanin in the hippocampus (pro- and anti-convulsant, respectively), Dr. Tallie Z. Baram (U.C. Irvine) will present evidence for the role of CRH in promoting excitability and triggering some developmental sei-zures, Dr. Scott Baraban (Case Western) will speak on termination of seizures in NPY-knockout mice, and Dr. W.F. Colmers will speak on the anti- and proconvulsant properties of NPY in the hippocampus. The Workshop will stimulate epilepsy researchers to regard the role of hippocampal peptides in clinical and experimental epilepsy, and to open a debate on the role of these neuromodulators in the physiology of the normal and epileptic brain. The abundance of pro- and anticon-vulsant actions of these peptides raises the potential for novel ap-proaches to anticonvulsant therapy.